CLAIMS

We Claim:

1. A packaged microelectromechanical device, comprising:

a microelectromechanical array that comprises a semiconductor substrate having circuitry and electrodes thereon;

a package for the microelectromechanical array, the package comprising a laminate formed by a plurality of substrate layers bonded together; and

a third substrate that is disposed between and bonded to both the semiconductor substrate and the package bottom substrate.

2. The device of claim 1, wherein the semiconductor substrate is silicon.

3. The device of claim 2, wherein the microelectromechanical array comprises a light transmissive substrate bonded to the semiconductor substrate.

4. The device of claim 3, wherein the light transmissive substrate is glass or quartz.

5. The device of claim 3, wherein the microelectromechanical array comprises a plurality of micromirrors formed on the light transmissive substrate.

6. The device of claim 5, wherein the semiconductor substrate comprises electrodes formed thereon for electrostatically attracting the micromirrors.

7. The device of claim 6, wherein at least 500,000 micromirrors are disposed on the light transmissive surface.

8. The device of claim 1, wherein the microelectromechanical array are formed directly on the semiconductor substrate.

9. The device of claim 8, wherein electrodes are disposed between the semiconductor substrate and the microelectromechanical array.

10. The device of claim 1, wherein the package laminate substrate layers are ceramic.

11. The device of claim 1, wherein the package laminate substrate layers are glass.

12. The device of claim 1, wherein the plurality of the package laminate substrate layers form a cavity in which the micromirror array device is located.

13. The device of claim 1, wherein the package laminate is a flat plate.

14. The device of claim 1, wherein the package laminate comprises an inlay glass that is transmissive to visible light.

15. The device of claim 1, wherein the third substrate has a CTE that is the same as the semiconductor substrate or between the CTE values of the semiconductor substrate and the package laminate bottom substrate.

16. The device of claim 15, wherein the CTE ranges from 3×10^{-6} to 7×10^{-6} .

17. The device of claim 16, wherein the third substrate is silicon.

18. The device of claim 17, wherein the third substrate is bonded to the semiconductor substrate with adhesives.

19. The device of claim 18, wherein the adhesives are organic adhesives.

20. The device of claim 1, wherein the third substrate is bonded to the semiconductor substrate with adhesives.

21. The device of claim 1, wherein the third substrate further comprises a discontinuous layer or plurality of layers.

22. The device of claim 22, wherein the third substrate is bonded to the semiconductor substrate with adhesives.

23. The device of claim 1, wherein the package laminate further comprises:

a first substrate having a heater along a periphery of the top surface of the first substrate and underneath said top surface;

a second substrate above the first substrate; and

a first sealing medium layer bonding the first substrate and the second substrate together.

24. The device of claim 24, wherein the first sealing medium layer further comprises a glass frit or solderable metallic material that bonds the first and second substrates together.

25. The device of claim 24, wherein the first substrate is a multilayered structure that comprises a plurality of substrate layers.

26. The device of claim 24, wherein the heater has a zigzag shape.

27. The device of claim 24, wherein the heater comprises a metallic material.

28. The device of claim 24, wherein the metallic material of the heater is formed by sputtering.

29. The device of claim 24, wherein the first substrate is ceramic.

30. The device of claim 24, wherein the second substrate is glass that is transparent to visible light.

31. The device of claim 24, wherein at least one surface of the second glass substrate is deposited thereon an anti-reflection layer for enhancing transmission of visible light through the glass substrate.

32. The device of claim 24, wherein the second substrate further comprises: another heater along a periphery of a surface of the second substrate and underneath said surface of the second substrate.

33. The device of claim 24, wherein the first sealing medium layer is a multilayered structure that further comprises a plurality of solderable metallization layers for metalizing the surface of the first substrate.

34. The device of claim 24, wherein the first sealing medium layer is a solderable metallization layer for metalizing the surface of the first substrate.

35. A method comprising:

attaching a microelectromechanical array with semiconductor substrate to another substrate with similar mechanical properties as said substrate using adhesives; and

placing and attaching said assembly to the package laminate bottom substrate using adhesives.

36. The method of claim 36, wherein the adhesive for attaching the microelectromechanical array with semiconductor substrate to another substrate is deposited in an even layer covering at least 80% of said substrate surface.

37. The method of claim 36, wherein the adhesive for attaching the assembly to the package laminate bottom substrate is deposited in an even layer covering at least 80% of said substrate surface.

38. The method of claim 39, wherein the adhesive for attaching the assembly to the package laminate bottom substrate is deposited in an even layer covering at least 80% of said substrate surface.

39. The method of claim 36, wherein the adhesive for attaching the microelectromechanical array with semiconductor substrate to another substrate is deposited on the middle of said substrate covering at least 33% of its surface.

40. The method of claim 41, wherein the adhesive for attaching the assembly to the package laminate bottom substrate is deposited on the middle of said substrate covering at least 33% of its surface.

41. The method of claim 36, wherein the substrate with similar mechanical properties forms a discontinuous layer or plurality of layers.

42. The method of claim 36, further comprising:

depositing an anti-stiction material within the cavity defined by the package laminate substrate.